

## INTRODUCTION

The gynecologic care of the prepubescent girl can be intimidating to the inexperienced clinician, and potentially harmful to the child if the practitioner forges ahead with little knowledge of the important differences between young girls and reproductive-age women. Yet, vulvovaginal disorders are the most common gynecologic complaints a clinician will see in the pediatric population. The child and parent are often anxious because symptoms have usually been present for some time, and many times initial therapies have been tried and failed. Family life is often disrupted due to chronic irritability and sleeplessness of the child and parental concern that the genital signs and symptoms are due to a life threatening illness. Often the etiology of the vulvar disorder is self limited and easily treated. However, a gentle but thorough evaluation is required by the physician to allay patient and parental anxiety and uncover the rare diseases that could be harmful to the child. In most settings, it becomes difficult to identify an "expert" in pediatric gynecology. Typical ob-gyn residencies may have one or two lectures yearly pertaining to pediatric gynecology, and pediatric residencies, while stressing the importance of the complete physical examination of the child, do not cover enough gynecology to make most pediatricians comfortable handling all but the most basic problems. However, someone should be identified, either in ob-gyn or pediatrics, who can aid in the examination of these children. \* If such an individual does not exist in the local program, the child should be referred for her care.

## ANATOMY OF THE PREPUBESCENT CHILD

Under the influence of maternal estrogen, the genitalia of the newborn female appear as similar to adult genitalia as they will prior to the completion of puberty. The vaginal mucosa is thick, and leukorrhea (that physiologic discharge seen in the reproductive-age woman) can be seen. Occasionally, a newborn girl will experience vaginal bleeding as a result in the sudden drop in circulation estrogen that accompanies parturition. The labia minora are evident as thickened folds of skin just inside the labia majora, which have fat pads and appear puffy. The introitus cannot be visualized without retracting the labia. The hymen will appear as lush folds of tissue.

These changes are gone within 6-8 weeks, as the effects of maternal estrogen wane over the next 2-3 years. By then, the genitalia assume the appearance that they will maintain throughout childhood. The vaginal mucosa becomes thin and atrophic, much like that in postmenopausal women. Vaginal discharge is not seen throughout childhood in the absence of minor or major infection. The labia minora become thin and flattened. The labia majora also become flattened and assume a more anterior position. These changes persist until the peripubertal and pubertal period. In the "frog-leg" position (see below under "Examination Techniques), the introitus can easily be visualized.

The hymen will appear very thin, almost opalescent and translucent. Knowledge of normal hymeneal anatomy forms the basis for one part of the examination of the sexually abused child, in that deviations from normal can assist one in determining the possibility of child abuse. Be aware, however, that in one study of girls selected for study due to definite abuse, 52% of them had normal hymens. Knowledge of normal hymeneal anatomy is also helpful in distinguishing those that can be left alone.

Just as changes occur in the external female genitalia, so too are the internal organs undergoing change. The corpus (uterine body or fundus) is relatively large in the newborn period, but becomes almost imperceptible in childhood. The ovaries are abdominal organs until puberty, and therefore ovarian neoplasm must be included in the differential diagnosis of any abdominal mass in this age group. At puberty, the ovaries assume their pelvic position and the uterine fundus begins to develop, so that ultimately the ratio of corpus-to-cervix is 2:1 in nulliparous women. In childhood, the cervix is very small, flush with the vagina, and on rectoabdominal examination feels like a small ridge of tissue.

The breasts of newborns are also more developed, and breast tissue may be palpable. Occasionally a physiologic discharge can be found. The areolas are larger and protuberant. All of these changes are reversed in childhood, and remain so until thelarche (breast development) begins at about age 8 to 9.

The child remains hypoestrogenic until puberty, and many of the gynecologic problems encountered in the young girl stem from these anatomic changes. There are other important aspects of the genital tract to be aware of, such as the vaginal microflora.

## **VAGINAL MICROFLORA OF THE CHILD**

There are published reports regarding the vaginal microflora of the child. In a study of 67 prepubertal girls cultured without (N=31) and with (N=36) vulvovaginitis, both aerobes and anaerobes were cultured. Lactobacilli do not constitute the primary organism in these children's vaginas, but they cultured significantly fewer times in the symptomatic children (38.7% vs. 11.1%). Other commonly found organisms included staphylococcus epidermidis, enterococci, streptococcus viridans, and escherichia coli. Candida albicans or other Candida species are not typically found in the child's vagina outside of the diapering period or in an immunocompromised state.

## **EXAMINATION TECHNIQUES**

### **Equipment**

Examination of little girls is quite different than examination of reproductive-age women:

- Speculums are not needed in most situations (see the "limited pelvic exam" below);
- Far more time is spent talking to children and very little time is spent conducting the exam;
- Children are not inclined to lie still for very long, so the exam must be accomplished swiftly;
- The rectoabdominal examination yields just as much information as the vaginoabdominal examination; in fact, vaginoabdominal examinations should not be performed on little girls;
- 85-90% of visits for pediatric gynecologic complaints are for vulvovaginitis, and identification of this problem does not require "fancy" equipment.

Basic equipment requirements include an excellent light source, a magnifying lens or colposcope, handheld mirror (for the child), 2% Xylocaine gel, culturettes, microscope slides and cover slips, non-bacteriostatic saline, and media for microbiologic studies. While it is unnecessary in most circumstances to visualize the entire vagina, there are instruments that enable one to do so. Simple devices such as nasal speculums, veterinary otoscopes, or even the otoscopes available in pediatric offices are usually close at hand. More expensive (and therefore less readily available) equipment includes hysteroscopes, 5mm laparoscopes, and Huffman vaginoscopes. The use of much of this additional equipment may require a very relaxed or anesthetized child, so only those skilled in their use should perform these procedures. A colposcope with camera is helpful to document significant findings.

### Positioning of the Child

No part of the preparation for the examination of a young girl is as important as positioning. Proper patient positioning is important to allow the best visualization of the vulva and vagina and to keep the child as comfortable as possible. Many children will be comfortable in the traditional lithotomy position with their feet resting in stirrups. Others may feel more comfortable in the supine “frog-legged” position. Placing the parent at the head of the exam table will give the child a visual focus. Infants and some smaller children are best examined in the parent’s lap with the parent gently grasping the child’s knees and flexing the hips. Examination of the hymen of the suspected sexually abused child in the knee-chest position is crucial. In most cases, vulvar and vaginal visualization are all that is required. Most pediatric patients do not need a complete vaginal or pelvic exam.

Giving the child a handheld mirror and allowing her to be part of the examination goes a long way toward achieving relaxation of the anxious child. It also gives her a measure of control that will be important in obtaining her trust and cooperation for a thorough examination.

### Visualizing the Vagina

Since most pediatric gynecologic complaints are due to vaginitis, visualization of the vagina is important to collect cultures, examine the hymen if relevant, and to rule out foreign bodies. Most diagnoses can be made *without* instrumentation by simply examining the lower part of the vagina. Hymeneal tissue in the postnatal period is thin enough that, with simple technique, it will fall away and allow complete visualization of the lower vagina. Vaginal inspection can be optimized by gently grasping the labia majora and pulling forward, laterally, and then toward the anus. Valsalva maneuvers may help to see the lower vagina. Perineal pressure helps to desensitize the child during inspection. In some cases, the entire hymen is not adequately visualized in the supine position; better visualization can then be achieved in the knee-chest position. Having the child “help” in locating symptomatic areas gives her a sense of control during the exam. Vaginal or rectoabdominal exams are required only if a mass is suspected.

### Specimen Collection

Touching the hymen may hurt a young girl, so every effort must be made to avoid this. Once she has been hurt, she will most likely close her legs, cry, and not allow you to finish your exam. It may be helpful to squeeze a generous (approx. 3-5 cc) of 2% Xylocaine gel on the hymeneal tissue and wait 5 minutes before attempting to go further. Wipe it off well prior to collecting specimens. Usually then the child will be remarkably cooperative with specimen collection.

Specimen collection in the presence of symptoms or vaginal discharge is important for identifying specific organisms and focusing treatment. Cotton tipped applicators may be too large and abrasive to gather specimens, so calcium alginate swabs (Calgiswabs) should be used. They are small enough to slip through the hymen without touching it. Alternatively, the “Catheter Within a Catheter” system using a 4½ inch IV catheter attached to a 3cc syringe and threaded within a 4 inch red rubber catheter will minimize contamination. Speculum exam should be used to visualize and culture the cervix in the sexually active adolescent. In the prepubertal female, signs of trauma in the presence of discharge require complete visualization of the cervix to rule out cervicitis and the vagina to rule out proximal vagina lacerations that need surgical repair. Anesthesia in the OR setting is often required.

## VULVOVAGINITIS

The little girl is susceptible to vaginitis due largely to her anatomy, her cognitive development, and her hypoestrogenic state: the tissues are thinner, the bacteria are different, and hygiene is usually poor, even with parents who talk to their daughter about the need to wipe from front to back, and to wipe well!

Vaginal discharge may be physiologic in the early neonatal period and in early puberty. The vaginal and cervical glandular tissues respond to maternal estrogen as in any healthy adult. Within six weeks postpartum estrogen levels are low. Genital tissues undergo atrophic changes and vaginal pH rises leading to an environment prone to infection. Other risk factors include poor or overly aggressive hygiene, short perineum, hymeneal obstruction, and altered immunity. Etiologic factors in pediatric vulvovaginitis range from physical or chemical irritants through a wide range of infectious organisms, to neoplasia (Huffman). Most cases are asymptomatic and the patient's mother notices a discharge on the girl's panties. The child may complain of itching or burning with urination... Candida infections are unusual in prepuberty with incidence ranging from 0-25% in studies. After excluding a diaper as the yeast source, care providers should suspect immunocompromised conditions such as diabetes. Sexually transmitted diseases should be ruled out with appropriate cultures and wet preps.

Specific anti-infective agents are recommended for specific organisms (Emans). Sitz baths in a tub of clear water 2x/day will clear up mild cases and antibiotics will not be necessary. Removal of offending agents is mandatory if they can be identified. Proper wiping techniques should be reinforced. In recalcitrant cases, or for many recurrences, patients benefit from a course of broad-spectrum antibiotics. Occasionally, a nightly dose of the antibiotic given for one month may cure the problem. Use of estrogen creams in an attempt to thicken the vaginal mucosa is generally not recommended due to the possibility of iatrogenic vaginal bleeding and breast development.

Parents need reassurance that these episodes of vaginitis will end at puberty in the child with many recurrences. If they are instructed to begin Sitz baths (B.I.D.) when symptoms first appear, this will often obviate the need for antibiotics.

## VAGINAL BLEEDING

There are many causes of vaginal bleeding in the prepubertal child. The most common is vaginitis. Other causes include trauma, tumor, isosexual precocious puberty, lichen sclerosis, urethral prolapse, and foreign body.

The most common type of trauma to the prepubescent genitals is non-penetrating (blunt) trauma due to **falls causing straddle injuries**. Children will often present with bleeding and an obvious hematoma. If there is no active bleeding, the hematoma is not expanding, and the child is able to void, ice packs for the first 24 hours and then warm soaks and analgesics is all that are usually necessary. If the hematoma is expanding, the child may require an exam under anesthesia and drainage of the hematoma.

Penetrating traumatic injuries **should be assumed to be secondary to sexual abuse in the absence of a history to explain the trauma**. Sexual abuse and trauma, however, can be difficult to recognize. Past insults may heal leaving subtle or no positive signs on physical exam. Nonspecific findings include vulvar redness, irritation, and abrasions; a friable posterior fourchette; labial adhesions; hymeneal tags; and nonspecific infections. Signs suggestive of sexual abuse include hymeneal tears, STDs, and bite marks on genitalia. The only definitive findings are the presence of sperm on the child, and pregnancy. When a penetrating injury is

**suspected, it is important to rule out penetration into the peritoneal cavity. A flat plate and upright of the abdomen looking for free air will rule this out. If there is free air, the child needs a laparotomy to correct the damage and to rule out internal bleeding. Small cuts to the labia can be repaired in the outpatient setting. Repair of vaginal lacerations will require general anesthesia.**

**Tumors** are thankfully uncommon. Sarcoma botryoides is a rare vaginal tumor that is seen in very young children. The typical age at presentation is 2-3 years. The tumor presents as a protrusion of vesicular tissue from the vagina. Therapy is largely surgical and chemotherapy. The prognosis is poor with this tumor.

**Precocious puberty** is a rare condition and it has many causes. Precocious puberty may be suggested by earlier-than-expected development of secondary sexual characteristics. A maturation index of vaginal secretions can suggest systemic estrogen status. Gonadotropin levels help differentiate between central and peripheral etiologies. Central precocious puberty requires evaluation of the brain to rule out a hypothalamic lesion while a pelvic and adrenal evaluation must be done in the presence of a peripheral precocious puberty. Central precocious puberty is treated with GnRH analog suppression of the ovaries while peripheral etiologies require treatment of the underlying disorder. Interested readers are referred to many of the excellent texts in the references. Early identification and treatment of this condition is essential to halt the growth spurt and to avoid social stigmata.

**Lichen sclerosis** can occur at any age, but is most commonly seen in post-menopausal women and in prepubertal children. It can have genital and extra-genital involvement. Children present with itching and bleeding (from scratching leading to subepithelial hemorrhages). The vulvar skin is thin, scaling, and hypopigmented. (Figure 1). If the child has been scratching enough, bruising may be evident, especially on the labia minora. Treatment largely consists of the topical use steroid fluorinated creams such as clobetasol (Temovate). The condition usually improves at puberty, but it may be chronic.

**Urethral prolapse** (Figure2 ) is a condition in which the distal third of the urethra, or some smaller part, protrudes and thus becomes irritated. This condition presents with vaginal bleeding and a deep red to purple mass can be seen protruding from the urethra. Treatment consists of the use of topical estrogen cream in small doses nightly over several weeks. Very small prolapses that are not progressive and cause small amounts of intermittent bleeding can be left alone, as the condition will resolve spontaneously at puberty. Larger prolapses or those that fail to respond and continue to cause significant bleeding can be managed surgically. \*

**Labia adhesions** will occasionally be seen in children. They are caused by continued irritation of the vulvar tissues resulting in scarring of the labia minora to one another. No treatment is necessary if the child is able to void spontaneously without difficulty and does not have a history of frequent urinary tract infections. These adhesions should never be forcefully opened. If treatment is required, use A&D Ointment nightly and apply with a little gentle pressure. Estrogen creams can be used if the A&D Ointment does not lead to satisfactory improvement.

**Figure 1: Lichen sclerosis**



**Figure 2: Urethral prolapse**



**Foreign bodies** are a common cause of vaginal bleeding in children. A vast array of objects have been removed from the vagina of little girls, but the most common is toilet paper. In this case, children do not necessarily push toilet paper into their vagina, but rather, small pieces of tissue that adhere to moist labia work their way into the vagina. Toilet paper generally appears as a small grayish-black mass just inside the vagina behind the hymen. Symptoms include a bloody, foul-smelling discharge and vulvar irritation. On examination, hyperkeratosis can be seen along the dependent ridges of the labia majora, and these resolve once the foreign body is removed. Often, the foreign body can be seen just inside the hymenal ring but often it may be high in the vagina; knee-chest position can aid in finding it in this case. Removal can be accomplished in the office if 2% Xylocaine Gel is used to anesthetize the hymen and a pair of Bayonet forceps is used to retrieve the item. Care should be taken not to touch the hymen as this is the part of the examination that is painful for the child (the Xylocaine helps). Toilet paper may become embedded in the vagina. In this case, or when the item cannot be easily retrieved, the child should be taken to the operating room for removal under anesthesia. The vagina should be copiously irrigated with saline after the removal. Antibiotics can be used for 7-10 days, although this may not be necessary if inflammation is minimal. ★

## MISCELLANEOUS CONDITIONS IN THE PEDIATRIC PATIENT

**Vaginal and hymenal cysts** are occasionally seen in the newborn and present as a cystic lesion protruding from the vagina. The vagina is intact in these cases (demonstrate this by finding the vaginal opening and gently passing a moistened cotton swab through it). No therapy is necessary unless a vaginal opening cannot be cannulated, in which case the "cyst" may represent a mucocolpos (vagina filled with mucus behind an imperforate hymen). Occasionally throughout a little girl's life, she may experience **isolated (often unilateral) premature thelarche**. Typically a small amount of firm breast tissue can be palpated under a raised areola. Almost always the breast will regress, as it is thought that these isolated changes represent low-level fluctuations in ovarian hormone production or perhaps increased end organ sensitivity to estrogen. Worrisome signs are the presence of axillary or pubic hair growth, or vaginal bleeding accompanied by a growth spurt (so-called precocious puberty). If the only presenting complaint is breast development (there has been no growth spurt, vaginal bleeding, etc.), the mother should be reassured and the child reexamined in 3 months. It is important to include a height and weight measurement at this visit so as to identify early isosexual precocious puberty since children often have an acceleration of growth at the onset of this condition.

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